

We Claim:

1. A semiconductor device, comprising:

a resistor; and

5 a chalcogenide material thermally coupled to said resistor to permit heat transfer therebetween, said chalcogenide material being programmable between a first resistance state and a second resistance by supplying a current to said resistor to heat said resistor,
10 substantially none of said current entering said chalcogenide material.

2. The semiconductor device of claim 1, wherein said resistor comprises a conductive material.

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3. The semiconductor device of claim 1, wherein said resistor comprises at least one material selected from the group consisting of titanium-tungsten, tungsten, tungsten silicide, molybdenum, titanium nitride, titanium carbon-nitride, titanium aluminum-nitride, titanium silicon-nitride, carbon, n-type doped polysilicon, p-type doped polysilicon, p-type doped silicon carbon alloys, p-type doped silicon carbon compounds, and n-type doped silicon carbon alloys.

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4. A semiconductor device, comprising:

 a programmable resistance material programmable between
 a plurality of resistance states;

5 a first energy source supplying an electrical energy to
 said memory material to read the resistance state of said
 programmable resistance material; and

10 a second energy source supplying a second energy to
 said programmable resistance material, said second energy
 causing said programmable resistance material to be heated
 so as to program said material from one of said resistance
 states to another of said resistance states without causing
 substantially any electrical current to enter said memory
 material.

15 5. The semiconductor device of claim 1, wherein said second
 energy is optical energy.

6. The semiconductor device of claim 1, wherein said
 programmable resistance material is a phase change material.

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7. The semiconductor device of claim 1, wherein said
 programmable resistance material includes a chalcogen
 element.

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8. A method of programming a semiconductor device, said semiconductor device including a chalcogenide material programmable between a plurality of resistance states, said method comprising:

5 applying an electrical current to said device; and
 converting at least a portion of said electrical current to heat energy, at least a portion of said heat energy programming said device from one of said resistance states to another of said resistance states, substantially
10 none of said applied electrical current entering said chalcogenide material.